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Nigeria Vision 20: 2020: A Reality or a Mirage

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Author's contribution

Author OKO designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. He also managed the analyses of the study and the literature searches, read and approved the final manuscript.

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ABSTRACT

Aims: The objective of this paper is to assess if Nigeria has achieved the path of economic development that will eventually lead to convergence and how long it will take her and at what rate she will be growing to reach her envisioned per capita income of \$4,000 in the year 2020.

Research design: Nigeria aims to become one of the top twenty nations in the world in the year 2020. To know if Nigeria will achieve this we examine the per capita income and consumer price index difference between Nigeria and industrialized nations (UK, US, Germany, France and Japan) and newly emerging markets (Malaysia, South Africa, South Korea, Singapore)

Place and Duration of Study: This study is centred on Nigeria and covers the period between 1960 and 2008.

Methodology: We utilise the Augmented Dick-Fuller test and modified Barro-type time series of cross section.

Results: The results showed that among the developed nations Nigeria can converge with USA and UK. While among the newly industrializing nations convergence is possible only with South Africa, South Korea and Malaysia. Also the results showed that Nigeria can catch-up with Germany, Japan, South Africa and Singapore in the long run. The Barro-type time series model yields evidence of conditional convergence in per capita income. The findings show that for Nigeria to attain the per capita income of \$4,000 in the year 2020, she needs to

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be growing at 19.1% annually. If she is growing at the 2010 growth rate of 8 %, it will take her about 27years to attain the dreamed per capita income.

Conclusion: Nigeria is growing but the rate of growth is lower than it is expected to attain a targeted per capita income in the year 2020. In this regard, more support ought to be given to the manufacturing sector where most growth is expected to come from.

Keywords: Nigeria vision; convergence; development status.

1. INTRODUCTION

Nigeria vision 20:2020 (NV20:2020) is the intent of Federal Republic of Nigeria to become one of the top twenty economies in the world by the year 2020, with over-arching growth target of no less than \$900 billion in GDP and a per capita income of \$4,000 per annum [1]. On economic front, NV20:2020 tends to achieve a globally competitive economy that is resilient, diversified and able to fully optimise Nigeria's human and natural resources to meet the needs and aspirations of her citizens. It tends also to achieve an industrialised economy with a globally competitive manufacturing sector that is tightly integrated with the primary resource base of the nation, and contribute about 25% to gross domestic product. To achieve these laudable aspirations, a number of critical areas are identified. These include threats to national security, war against corruption, correcting the weaknesses of the revenue allocation, expansion of investments in critical infrastructure, fostering private sector non-oil growth to build the foundation for economic diversification. Other areas identified are investing in human capacity development to enhance national competitiveness, entrenchment of merit as a fundamental principle and core value and deepening of reforms in social sector and sub-national levels [2]. Including insecurity of lives and property as one of the critical areas shows that internal security is vital to Nigeria transition to development status in the year 2020. Internal security is the act of keeping peace within the borders of a sovereign state, generally by upholding the national law and defending against international security threats [3]. Threats to the general peace may range from low level civil disorder, large scale violence or even an armed insurgency. Threats to internal security may be directed at either the state's citizens or the organs and infrastructure of the state and may range from petty crime, serious organised crime, political or industrial unrest or even domestic terrorism. Sustainable economic growth driven by the private sector requires a good environment characterised by security of lives and property, prevalence of the rule of law, sanctity of contracts and respect for property rights.

Can Nigeria converge amidst insecurity of lives and property? In an insecure country or region, so the argument goes, each country must devote a disproportionate share of its endowment of scarce economic resources to "unproductive" military spending to keep the country calm. This calls for security reform to meet the need of investors and individuals as well. According to Bendix and Stanley [4] the reform of the security sector is an essential element in the fight against poverty. The rationales for security reform are: a) the role of the state and its security forces direct impact on opportunities for sustainable development, since the basic security is pre-condition for economic development b) reducing expenditure on security forces, free resources for social investment and poverty reduction c) the security sector, especially the police and the military often contributes to violent conflict rather than containing or preventing it and violent conflict is recognised as one of the major causes of poverty and d) greater participation in security policy and access to security is expected to

make policies more responsive to the concern of the poor, as well as strengthening democracy by guaranteeing transparency and accountability in the most sensitive areas of policy. Responsibility for internal security may range from police to paramilitary forces and in exceptional circumstances the military.

Another rationale behind the study is that outside the industrial world convergence club there appears fewer tendencies for per capita income differences between developed nations and developing countries to narrow (see [5,6]), given the close trade, immigration and educational link between Nigeria and these countries - Britain, United States of America, France, Germany and Japan, it is interesting to test whether any evidence of convergence exists. Investigating pair-wise economic GDP per capita convergence between these countries should shed light on Nigerian – Britain economic relations and on the convergence hypothesis more generally and also whether we are moving toward expected goal – to become one of the top twenty developed nations in the world in the year 2020.

The question of how far has Nigeria achieved this very laudable objective centres on the issue of convergence. The Nigeria vision provides a unique opportunity to carry out a quantitative analysis of convergence in selected macroeconomic fundamentals. Theoretically, there are two principal reasons to expect the convergence of macroeconomic variables of Nigerian economy. First, Nigeria engaged quite heavily in international trade with many countries of the world notably United States America, Japan, Britain, Germany etc. Because it involves the flow of capital and goods, international trade, if bilateral, serves as a natural means of coordinating the economic development of the parties involved. Ben-David [7] provides evidence that income convergence among countries, while far from being a worldwide phenomenon, seems to be a prevailing feature among the countries that trade extensively with one another. Second, Nigeria is member of regional integrations like ECOWAS (Economic Community of West African States), cartel – OPEC (Organisation of Petroleum Exporting countries) and World Trade Organisation (WTO). The abolition or review of many restrictive trade barriers and financial regulations and the Nigeria's membership of the World Trade Organization (WTO) have enhanced the Nigeria's position in multilateral trading system and thus convergence.

Economic convergence should be achieved around a higher level of growth which implies that Nigeria needs to grow faster so that it can in the long run, catch up economically with the developed countries as a result of dynamic consequences of regional integration and globalization. Third, there are policies adopted by Nigerian government, which might facilitate the narrowing of the gap in per capita income between Nigeria and developed nations. These include the privatization policy of state-owned companies that have to undergo critical restructuring to improve productivity and policies that are related to investment which seek to eliminate constraints to investments by foreign and domestic investors. Other policies or programmes related to poverty reduction like Poverty Alleviation Programme (PAP), National Poverty Eradication Programme (NAPEP), National Directorate of Employment (NDE), Women in Agriculture (WIA), Micro-credit program through microfinance banks, are pursued. Also Nigeria is a signatory to millennium development goals. A return of democracy is also an added advantage which creates an environment in which the entrepreneur can flourish. There are critical areas that might prevent her from achieving this vision. The notable areas include corruption, poverty, threats to national security, crimes (armed robbery, kidnapping and advanced fee fraud, a.k.a 419) and more especially psyche deterioration or loss of sense of values.

The objective of this paper is of twofold. The first is to assess whether Nigeria, through development strategies, has achieved a path of economic development which leads to a certain degree of convergence in real per capita income and macroeconomic policy. The second objective is, if Nigeria has achieved a path of economic development, how long will it take her to reach the target taking insecurity into account? Thus as security is a prerequisite for a journey to development status, security reform is essential. Important security reform required is that which seeks to link the challenges and opportunities and at the same time imbue them with a common vision - that of a security sector which promotes human development; helps to reduce poverty and allows people including poor people to expand their options in life.

This paper contributes to macroeconomic policy literature in the following ways. First it assesses the validity of the alternative economic growth strategies. Secondly, the estimates of speed of convergence across economies provide information on one of the key parameters of growth theory. Thirdly, the convergence analysis which is synonymous with assessment of Nigerian development strategies is vital in strengthening of macroeconomic policy credibility, effectiveness and stability. This will lead to reformulation of specific goals and strategies for macroeconomic convergence. To the best of our knowledge, no study has attempted to assess the validity of Nigeria economic growth strategies namely Nigeria vision 2020.

The paper is organised as follows. The next section is the overview of Nigerian economy, Section three examines a theoretical link between security and economic growth while section four discusses convergence theory and model. Section five looks at the testing strategy while section six presents the data sources. Section seven presents and discusses the results and section eight concludes and draws some policy implications.

2. OVERVIEW OF NIGERIAN ECONOMY

Nigeria economy was structured along the line of mixed economic system and all economic activities are conducted within this framework. The Nigerian economy before Structural Adjustment Programme in 1986, has been transformed from subsistence agrarian society into a largely monetised economy. This was made possible by the discovery and exploration of oil in large quantities in the early 1970s. The transformation consists of three periods - 1973- 1978, 1979 – 1983, and 1984 – 1986 coinciding with oil boom. The oil boom in the early 1970s had a pervasive effect on the growth and development of the economy. Within this period, oil became the dominant sector of the economy, accounting for more than 90 % of exports and the main source of revenue. Between 1972 and 1974, the Federal revenue from oil was about 80% of the total revenue. However, between 1975 – 1978 period, oil revenue from oil sector grew modestly due to OPEC (organisation of Petroleum exporting countries) rules which required Nigeria to cut down oil production.

The Nigerian new wealth radically affected the scope, and content of investment, production, and consumption patterns, the government approach to economic management and policies and programmes implemented. During this period, the public sector driven growth policy was conceived and pursued. Governments both federal and states established a lot of public companies which were ill-managed. According to World Bank [8], Nigerian expenditures increased doubling between 1973 and 1974 and between 1974 and 1975. Much of this increase went into public investments. Measured at 1984 prices, the share of investment in GDP increased from less than 12% in 1971 to more than 25% in 1977. Apart from the public investments the growth in oil revenue was absorbed by public sector spending. The increase

in public spending went to improving transportation and social services. Transportation facilities, especially roads and ports were expanded significantly.

However, many public projects were undertaken without the requisite analysis of their long term financial viability and efficiency with which such projects were implemented in the past. The rapid growth of the public sector and the construction boom that accompanies the massive investment programme altered the prevailing pattern of relative prices and wages and changed the underlying structure of the economy. A rapid increase in public expenditures notwithstanding, the growth in oil revenue was sufficient to maintain a federal budgetary surplus yet in 1976, expenditures began to outpace revenue. State budgets also began to show deficits. Economic problems began to surface in 1978, but a second oil boom in 1979 lent confidence that oil revenue would in fact be a sound basis for planning and sustaining public sector consumption and investment [9]. Although, the 1979 – 1983, period was termed second oil boom, the economic problem that had begun in 1978 remained unchanged. In 1980 – 1981, the terms of trade which has remained relatively constant through 1979, doubled. This prompted the Nigeria government to increase public expenditures leading eventually to a deficit in 1980. The overall growth in GDP was only 4.2% in 1980. Agricultural GDP grew by 6.4% and industrial GDP by 7.3% but petroleum sector GDP declined by 11.6%. Also exports fell by 9.5% while imports grew by 27.2%. In 1982 oil prices fell precipitously, leading to severe terms of trade and fluctuations in real income. All these economic problems led the Nigeria government to a budget deficits and increase in external borrowing. To salvage the economy, government sought the World Bank and International Monetary Fund assistance and adopted Structural Adjustment Programme (SAP) in 1986. In 1986, Nigeria borrowed money from IMF with conditionality. This escalated the economic problems in the economy due to poor implementation and corruption among the government officials responsible for the execution of the programme. Most budgets hinged on the price of crude oil which means that a fall in price of crude oil price was translated into budget deficits. Prior to these decades agriculture was the main stay of the Nigeria economy. About 70% of export came from agriculture.

After the return to democratic rule in 1999, Nigeria is seen as one of the fastest growing economies in the world in the past decade. The average annual growth rate of GDP over the period between 2004 and 2012 is 6%. This was higher than the growth record in 1980. In 2011, the economy grew robustly at 7.45%. The expected growth in 2012 is about 6.5%. This is due to slow-down in world economy arising from the crisis in global financial markets and unstable global energy market developments. Real per capita income grew at 3% per annum. Despite the robust and sustained economic growth, there is no net gain in productive employment for the majority of the labour force. The unemployment rate rose from 14.1% in 2008 to 21.4% in 2010. The well-being of average Nigerian is declining. The incidence of poverty rises significantly in both absolute and relative terms. The number of the people, that is poor almost doubled between 2004 and 2010 (68.7 to 112.47 million) [10]. Poverty incidence within this period rose by about 20%. Another notable but adverse development is the trend in the distribution of the benefits of economic growth. The Gini coefficient, an indicator for measuring income inequality, show that income inequality increased, rising from 0.429 in 2008 to 0.447 in 2010.

A great challenge to Nigerian government today is the maintenance of law and order. The ability of Nigerian government to manage her Internal Security by the Security Agencies is being doubted. Primarily, the Federal Government is charged statutorily via the Military and Paramilitary Agencies to protect the citizens from all forms of security threats and incidents like armed robbery, kidnapping, civil disorder, large scale violence, insurgency, domestic

terrorism and other forms of security breaches. However, the opposite appears to be the case, judging from the spate of unfortunate violence crises that have engulfed the country recently, with the attack on the Nigeria Police Force Headquarters and arm cantonment Kaduna as the most disturbing one. These developments in the Nigerian economy pose great challenges to Nigeria match to development status in 2020.

3. LITERATURE REVIEW

3.1 Theoretical Considerations of Security and Economic Growth

Economic development theorists generally hold that security is a prerequisite for economic growth [11]. The theoretical link between security and economic growth is not linear or direct. Security is not a physical input in the production function. There are two possible ways through which security impact on economic growth. First is through preservation of lives and properties. Where insecurity of lives and properties rises the economic performance is likely to be derailed. This is possible because workers embodied with knowledge (human capital) are lost in the process; capital per worker is likely to be reduced; innovations may not take place. Economic theory has it that population is critical to economic growth. A country with a small population is constrained in terms of human capital production and productivity. However, if the country wishes to maintain the level of its innovation or R & D (Research and Development) activities or improve productivity it can do this at high cost. It may choose to hire expatriates at high cost. The expatriates may accept to work in a country with high security risk at a price that will cover the cost of the expected risk.

The second channel is through its effect on investment or erosion of investors' confidence on the host country. As insecurity rises the proportion of GDP devoted to military spending or purchasing of arms increases. This diverts funds from productive activities to unproductive ones. This might be expected to depress a country's secular growth performance. Other things being equal, a rise in military spending exerts a negative impact on the rate of investment in (public and private) productive fixed capital. This occurs because of well-known crowding-out effects: an increase in military spending must be financed either by raising current taxes or by borrowing (future taxes). In either case, it will lower the expected after-tax return on productive fixed capital, while simultaneously reducing the flow of (domestic plus foreign) savings that is available to finance productive fixed capital formation in the domestic economy (see [12]; [13]). This channel is likely to be particularly important in the case of net-debtor developing countries. Since such countries are faced with external financing constraints, a rise in military spending to the extent that it is not associated with larger net capital inflows to finance a higher external current account deficit can be expected to crowd out capital investment and/or private consumption [14]. In the context of developing countries, Hewitt contends that the justification for military expenditures must be from national security grounds, since the economic benefits are limited. Apart from its effect on investment insecurity is capable of eroding investors' confidence and thus diminishes the per capita output and learning by doing or technology transfer.

Military expenditures may affect the growth path of capacity output through their direct impact on the efficiency of resource allocation. Since military spending is not governed by market processes, it tends to create distortions in relative prices that result in a dead-weight loss to total productive capacity. In addition, it may exert negative externalities on capacity output. There are several ways in which these inefficiencies directly affect the growth rate. First, a higher deadweight loss to domestic production results from either an increase in

contemporaneous taxes or heavier borrowing to finance higher military spending; borrowing from the banking system often leads to higher inflation, which distorts resource allocation. Second, research and development activities may concentrate on military progress at the expense of technological advances in economically-productive areas. Third, policies implemented to support a military program are often detrimental to efficient resource allocation and market growth: examples are trade restrictions, nationalization of military equipment producers, military procurement preferences for certain firms and industries, and compulsory military service. Finally, rent-seeking activities grow around the military because of its non-competitive allocation of resources. In this way, over and above their depressing effect on the level of investment, military expenditures may exert a direct adverse impact on the economy's productive efficiency.

3.2 Convergence Theory and Model

The concept of convergence implies that the poor countries with initial low GDP per capita grow faster than the rich countries or is the tendency for per capita income of different economies to equalize over time. This is one of the predictions of Solow's [15] neoclassical growth model. Solow's model predicts that convergence exists among different economies regardless of the initial conditions once the determinants of aggregate production function are controlled for [16]. It therefore requires a negative correlation between initial per capita output and its growth rate, so that poor countries will catch up with wealthier countries. Diminishing returns provide a simple economic underpinning for the convergence hypothesis. Barro and Sala-i-Martin [17] and Mankiw et al. [18] argue that investment in human capital might reduce the tendency for returns to diminish. However the insecurity in an economy might reduce the returns on investments and thus prolongs the time of convergence or catching up. Barro [19] and Mankiw et al. [20] find that convergence can be achieved among economies that exhibit similar characteristics and when human capital variables such education and savings rates are controlled for. Not all tests of convergence are interesting in their own right but they emerge as one natural testable implication of alternative models of growth. However, convergence is but one implication of such models and does not in itself represent a full test of the competing approaches. Currently, three basic estimation and related testing approaches are used.

a) Barro-type time series of cross sections: Here the cross-section correlation between the initial per capita output levels and subsequent growth rates for a group of countries is examined. Evidence of convergence exists if a negative correlation exists i.e. countries with low per capita initial incomes, on average, grow faster than those with higher initial per capita incomes. We define the average growth rate for each (i) economies as $g_{i,T} = T^{-1}(y_{i,T} - y_{i,0})$. As such, tests of convergence involve the estimation of the following equation:

$$g_{i,T} = \alpha + \beta y_{i,0} + \varepsilon_{i,T} \quad (1)$$

where T is a fixed horizon and ε is a random disturbance term with mean zero. Support for the hypothesis is inferred if $\beta < 0$ with the alternative hypothesis, $\beta \geq 0$. Some formulations would add extra control variables to equation Eq. (1). For example, in Mankiw *et al.* [21] savings and population growth rates are included. In such cases, $\beta < 0$ implies that convergence holds conditionally on some set of exogenous factors. The main technical

problem with such tests is that they cannot identify groupings of countries which are converging. Furthermore, they are tests of catching-up not convergence as the $\beta < 0$ property represents the process of converging (catching-up) not convergence itself. Tests of this cross-sectional type will not be utilized in this study, though conditional convergence will be tested with time series of per capita income with modification of this equation. Onwuka, Baharumshah and Habibullah [22] utilised the modified Barro-type to examine the convergence in per capita GDP and productivity in ASEAN (Association of South East Asia Nations) countries. For unconditional convergence this equation was estimated.

$$g_t = \ln y_t - \ln y_{t-1} = \alpha + \beta \ln y_{t-1} + e_t \quad (2)$$

For conditional convergence we specify the following equation

$$g_t = \alpha + \beta \ln y_{t-1} + \phi \ln Sec_t + \gamma \ln Ex_t + \lambda \ln rer + e_t \quad (3)$$

where g_t is the growth of real GDP per capita, approximated by logarithm difference, y_{t-1} is the level of real GDP per capita at $t-1$, β indicates the rate of convergence and it is expected to be negative. A positive sign will indicate divergence. Sec is the internal security; Ex is export of goods and services and rer is the real exchange rate. e_t is the random error that is normally and independently distributed with mean equal to zero and constant variance.

b). Bernard-Durlauf type time series: In this approach, tests of convergence examine the long run behaviour of the differences in per capita output across countries. The main feature of this class of tests is that convergence which implies such differences will always be transitory in the sense that long-run forecasts of the difference between any pair of countries converge to zero as the forecast horizon grows. The main testing feature of this approach is that output differences between two economies contain a unit-root or time trend if the countries have converged. However, the approach also distinguishes convergence from the tendency to catch-up, where again a strong implication is the absence of a unit root, although significant time-trend effects can exist. In particular, Durlauf [23] and Bernad and Durlauf [24] utilize the Dick-Fuller unit root testing procedure as a time-series based test for convergence. Here convergence implies output innovations in one economy should be transmitted internationally. Tests for time series notion of convergence require cross-country per capita output differences to be stationary. Utilizing slightly different definitions to Bernad and Durlauf [25], this can be illustrated via the concepts of catching-up and long-run convergence.

Catching-up: consider two countries i and j , and denote their log per capita real output as y_i and y_j . Catching-up implies the absence of a unit root in their difference $y_i - y_j$. Non-stationarity in $y_i - y_j$ must violate the proposition, although the occurrence of a non-zero time trend in the deterministic process in itself would not. Long-run convergence: Consider two countries i and j , and denote their log per capita real output as y_i and y_j . Long run convergence implies the absence of a unit root in their difference $y_i - y_j$ and the absence of a time trend in the deterministic process. Catching-up differs from long-run convergence in

that the latter relates to some particular period T equated with long-run equilibrium. In the former case, the existence of a time trend in the stationary $y_i - y_j$ series would imply a narrowing of the log per capita output gap or simply that the countries though catching up had not yet converged. This catching-up could be oscillatory, but must imply non-divergence of output differences. Conversely, the absence of a time trend in the stationary series implies that catching-up has been completed.

As defined in the foregoing, test of catching-up and long-run convergence hinge, therefore on the time-series properties of $y_i - y_j$. The natural route for such tests involves Dick-fuller types tests based on the bi-variate difference in log per capita output between pairs of the countries, i and j , i.e.

$$y_{it} - y_{jt} = \mu + \alpha(y_{i,t-1} - y_{j,t-1}) + \beta t + \sum_{k=1}^n \delta_k \Delta(y_{i,t-k} - y_{j,t-k}) + \varepsilon_t \quad (4)$$

where y indicates the logarithm of per capita output. If the difference between the output series contains a unit root, $\alpha = 1$ output per capita in the two economies will diverge. The absence of a unit root, $\alpha < 1$ indicates either catching-up, if $\beta \neq 0$ or long-run convergence, if $\beta = 0$. Tirelli [26] and Kumo [27] utilized the Bernar-Durlauf type time series to examine the convergence in per capita income and price stability in West-Africa and Southern Africa sub-regions respectively. Kumo finds that the real per capita income of Botswana and South Africa tended to converge to the real regional average per capita GDP during the period 1992-2009. While the Botswana's economic growth was anchored by higher savings and fixed investment rates during the period under consideration the South Africa's improved performance was associated more with increased openness of the economy following democratization in 1994 and higher initial income levels. In Nigerian vision 20:2020 the Nigeria aims to be one of top twenty developed nations. We are not interested if Nigeria is converging to regional average per capita income but rather if she is catching up with the developed nations like USA, Britain, France etc.

4. TESTING STRATEGY

Testing strategy for convergence within the Bernard-Durlauf-type framework involves a two stage process. First, check for the existence of a unit root in the difference between per capita incomes in the two countries concerned. The non-rejection of a unit root implies non-stationarity and rejection of the time-series property implies the convergence. Contingent on rejection of the unit root hypothesis is the convergence criteria requirement that significant time-trend effects are absent. Furthermore, strong convergence would imply the insignificance of the constant term.

Testing for catching-up involves the first two stages of testing for convergence, i.e. rejection of a unit root and checks on the significance of the time trend but becomes an issue only if the time trend is significant. Note that the concept does not require a zero constant. However, catching-up as a long-run property of the model would be inconsistent with a constant, non-time varying, time-trend as, asymptotically, and a constant time-trend effect would always imply divergence as $t \rightarrow \infty$ ([28], [29]). Therefore catching-up characterised by stationary output differences and a constant time-trend is relevant only for a particular

finite T and only on the basis that the countries have already converged. Hence, checking for convergence would be always the first stage, which requires stationary output differences, followed by tests of catching-up. Note, stationary output differences would imply either convergence or catching-up on parallelism, .i.e. identical growth rates for all time periods. In the bivariate case this requires that the outputs be cointegrated with cointegrating vectors $[1, -1]$. Li and Papell [30] refer to this notion of convergence as time series convergence. If they are cointegrated with cointegrating vector $[1, -\lambda]$ there are common trends in output. Thus cointegration between economies is a necessary but not a sufficient condition for convergence.

We examine the unit root hypothesis in relative per capita income, consumer price index of Nigeria and five developed economies - Britain, United States of America, France, Germany and Japan and four newly industrializing economies – South Africa, South Korea, Malaysia, and Singapore using ADF tests. Price stability is one of the goals of macroeconomic policy. Price stability allows us to limit the distortionary effects of inflation [31].

Some simulations are essential. For this exercise we pose the following questions. At what rate will Nigeria grow to reach the target per capita income of \$4,000 in the year 2020? To achieve this aim we employ the following text book formula [32].

$$\begin{aligned}
 y_{2020}^{Nig} &= y_0^{Nig} (1 + g^{Nig})^n \\
 \$4000 &= y_0^{Nig} (1 + g_{Nig})^{12} \\
 \frac{4000}{y_0^{Nig}} &= (1 + g_{Nig})^{12} \\
 12 \ln(1 + g_{Nig}) &= \ln 4000 - \ln y_0^{Nig} \\
 \ln(1 + g_{Nig}) &= (\ln 4000 - \ln y_0^{Nig}) / 12 \\
 g_{Nig} &= e^{(\ln(4000 - y_0^{Nig}) / n)} - 1
 \end{aligned} \tag{5}$$

where the \$4,000 is the Nigeria per capita target in 2020, y_0^{Nig} is the per capita income of Nigeria at the base period and n is the number of years.

5. DATA SOURCES

The data on real per capita income, consumer price index were collected from World Key Development Indicator (WDI) data base [33]. The data covers the period between 1960 and 2008. The country is grouped into two - developed and newly industrializing economies. The developed nations included are Britain, United States of America, France, Germany and Japan while the newly industrializing economies include South Africa, South Korea, Malaysia, and Singapore.

6. EMPIRICAL RESULTS

6.1 Times-Series Test for Convergence

We begin the analysis by testing for long run convergence and catching-up in per capita income differences as specified by equation (4). We first apply the conventional ADF tests to investigate unit roots in relative per capita income. We run a regression on the first difference of the logarithm of relative per capita income on a constant, the lagged level of the dependent variable and k lagged first differences as seen in equation (4). We use Schwarz information criterion to select the lag length. We also run the ADF with time trend. Table 1A and 1B indicate that for the period 1960-2008, there is evidence of convergence hypothesis, since a unit root is rejected in some cross-country differences in GDP per capita. Without a time trend, the unit root is rejected in two cases of developed nations (USA-NG and UK – NG) at 5% and 1% level of significance and there is evidence of Nigeria converging to the newly industrializing nations except in the case of Singapore. As α is different from zero, the convergence found constitutes the evidence of deterministic convergence (weak convergence).

Table 1A. Unit root tests: Differences in GDP per capita ADF without trend

Countries	α	t_α	k	Critical values		
				1%	5%	10%
USA-NG	-0.751	-3.373**	2	-3.585	-2.928	-2.602
FR-NG	-0.529	-1.958	5	-3.592	-2.931	-2.604
GM-NG	-0.478	-2.179	3	-3.639	-2.951	-2.614
JP-NG	-0.0476	-1.814	4	-3.592	-2.931	-2.604
UK-NG	-0.679*	-4.794*	0	-3.578	-2.925	-2.601
SK-NG	-0.705*	-4.912*	0	-3.578	-2.925	-2.601
SA-NG	-1.026*	-4.581*	3	-3.589	-2.930	-2.603
SG-NG	-0.729	-2.239	4	-3.592	-2.931	-2.604
MAL-NG	-0.664*	-4.729*	0	-3.578	-2.925	-2.601

Table 1B. Unit root tests: Differences in GDP per capita ADF with trend

Countries	α	β	t_α	k	Critical values		
					1%	5%	10%
USA-NG	-0.763	-0.0006 (0.518)	-3.392***	2	-4.176	-3.513	-3.187
FR-NG	-0.646	-0.0009 (0.2122)	-2.281	4	-4.186	-3.518	-3.190
GM-NG	-1.826	-0.0042 (0.0105)	-3.402***	8	-4.310	-3.574	-3.222
JP-NG	-0.851	-0.0018 (0.0663)	-3.607**	2	-4.176	-3.513	-3.187
UK-NG	-0.679	-0.0002 (0.848)	-4.745*	0	-4.166	-3.509	-3.184
SK-NG	-2.005	-0.0005 (0.524)	-4.917*	0	-4.166	-3.509	-3.184
SA-NG	-0.381	-0.0014 (0.0293)	-5.152*	10	-4.227	-3.537	-3.200
SG-NG	-0.967	-0.0016 (0.0948)	-4.012**	2	-4.176	-3.513	-3.187
MAL-NG	-0.666	0.00022 (0.7845)	-4.689*	0	-4.166	-3.509	-3.184

*denotes statistical significance at the 1% level, ** denotes statistical significance at the 5% level

*** denotes statistical significance at the 10% level, Figures in bracket denote probabilities

Based on Table 1B, there is evidence of Nigeria converging but there is no strong evidence of catching up with the developed nations and newly industrializing nations as the most β coefficients are not significant and where they are significant, the significance level is weak. We are able to reject the unit root hypothesis in favour of trend stationary alternative if α is significantly different from zero. In this case stationarity of differences in per capita income constitutes evidence of stochastic convergence. Although Nigeria trades extensively with USA and Britain, but she is not catching up with them. She is only catching up with Germany and Japan.

Table 2A presents the results of ADF tests without trend on differences in consumer price level. From the Table 2A there appears to be evidence of convergence in price level. That is, Nigeria is converging in price levels but at different rates to developed nations and newly industrializing markets. The rate of converging to developed nations appears to be slow while the rate of convergence to newly industrializing nations is faster.

Table 2A. Unit root tests: Differences in consumer price index ADF without trend

Countries	α	t_α	k	Critical values		
				1%	5%	10%
USA-NG	-0.374	-3.225**	0	-3.578	-2.925	-2.601
FR-NG	-0.342	-3.059**	0	-3.578	-2.925	-2.601
JP-NG	-0.344	-3.087**	0	-3.578	-2.925	-2.601
UK-NG	-0.357	-3.140**	0	-3.578	-2.925	-2.601
SK-NG	-0.450	-3.416**	1	-3.606	-2.937	-2.607
SA-NG	-0.612	-4.489*	1	-3.581	-2.927	-2.601
SG-NG	-0.524	-3.958*	1	-3.581	-2.927	-2.606
MAL-NG	-0.511	-3.860*	1	-3.581	-2.927	-2.606

Table 2B. Unit root tests: Differences in consumer price index ADF with trend

Countries	α	β	t_α	k	Critical values		
					1%	5%	10%
USA-NG	-0.421	-0.0013 (0.3090)	-3.380***	0	-4.166	-3.509	-3.184
FR-NG	-0.408	-0.0016 (0.2211)	-3.312***	0	-4.166	-3.509	-3.184
JP-NG	-0.432	-0.0019 (0.1617)	-3.419***	0	-4.166	-3.509	-3.184
UK-NG	-0.425	-0.0016 (0.2113)	-3.400***	0	-4.166	-3.509	-3.184
SK-NG	-0.537	-0.0021 (0.2296)	-3.606**	1	-4.205	-3.527	-3.195
SA-NG	-0.691	-0.0018 (0.1309)	-4.809*	1	-4.171	-3.511	-3.186
SG-NG	-0.6.17	-0.0021 (0.1372)	-4.280*	1	-4.171	-3.511	-3.186
MAL-NG	-0.583	-0.0017 (0.2013)	-4.090**	1	-4.171	-3.511	-3.186

*denotes statistical significance at the 1% level, ** denotes statistical significance at the 5% level,

*** denotes statistical significance at the 10% level

With time trend, however, there is still evidence of convergence in price levels. But the convergence seems to be weaker for developed nations than the newly industrializing nations (Table 2B). Nigeria is not catching up either with developed nation nor the newly industrializing markets, as β coefficients are not significant at any level.

6.2 Unconditional and Conditional Convergence

To test the unconditional and conditional convergence we utilize the Barro-type time series model as specified in equations (2) and (3). Equation (3) includes the control variables. The control variables we include are export, internal security and real exchange rate. As we mentioned earlier, Nigeria is expected to converge and catch up with the developed nations and the newly industrializing nations as she trades with them and participates in multilateral trading system. In the analysis we utilize the linear regression (Autoregressive errors in Exact Maximum likelihood). The results of unconditional and conditional convergence regressions are reported in Table 3.

Table 3. Unconditional and conditional convergence tests

Unconditional convergence				
Variables	Coefficients	Standard errors	t-stat	Prob
$\ln y_{t-1}$	-0.0589	0.8602	-0.685	0.498
c	0.3558	0.5102	0.697	0.490
Conditional convergence				
$\ln y_{t-1}$	-0.2004	0.1074	-1.866	0.071
$\ln Ex$	0.0349	0.0196	1.746	0.090
$\ln ise$	0.0211	0.0120	1.763	0.087
$\ln rer$	0.0386	0.1821	2.121	0.042
c	0.1416	0.4724	0.299	0.766
R^2	0.248	$F - stat$	2.052 (0.099)	Log-likelihood ratio =62.01

In the case of unconditional convergence the lagged per capita income carries a negative sign but it is not significant. This means that Nigeria is diverging. Also with the control variables like internal security, export and real exchange rate, the lagged per capita income maintains its negative sign and is marginally significant at 10% level. This indicates that there is evidence of convergence in per capita income or that Nigeria tends to grow faster than the developed or rich nations. The coefficients of international trade, internal security and real exchange rate are significant. This indicates that these variables are necessary for Nigeria to converge and catch up with the developed nations. Exporting rather importing is a vital in convergence. This makes real exchange rate depreciation meaningful. The internal security is important as meaningful economic activities will not take place in a nation where lives and properties are not secure. Internal security, though significant at 10%, needs to be improved so as to increase aggregate domestic products.

6.3 Simulations

At what rate will Nigeria grow to attain a per capita income of \$4,000 in the year 2020 using the base year 2008? Using the equation (5) it is discovered that for Nigeria to attain \$4,000 per capita income in the year 2020 it must grow at the rate of 19.1% per annum. However, if Nigeria eventually attains this level of income per capita, in 2020, how many years will it take

this income to double? Applying Rule 72, it will take about 4 years (3.77 years)¹ to double. As catch-up is the major issue in the vision 20:2020, it becomes necessary to know the rate at which Nigeria will be growing per annum to catch up with these countries' per capita income in 2008 base year. We employed equation (5) to calculate this rate. The results of this exercise are reported in Table 4. From the Table 4 it can be seen that for Nigeria to catch up or attain the per capita income of USA in 2008 it will be growing at 72.2% per annum starting from the inception of vision 20:2020 in 2000. From the inception 2000 to 2020, to reach the 2008 per capita income of USA, Nigeria will be growing at the rate of 24.35% annually. For Nigeria to catch up with South Africa per capita income in 2008, it requires Nigeria to be growing at the rate of 10.7% per annum.

Table 4. Percentage at which Nigeria will grow to reach base year (2008) income

Countries	2001 – 2008 (8yrs) (%)	2001 – 2020 (20yrs) (%)	2008 – 2020 (12yrs) (%)
USA	72.17	24.3	42.6
UK	66.5	22.6	40.5
France	62.3	21.4	38.1
Gm	63.8	21.8	39.0
Japan	73.6	24.7	44.4
South Africa	29	10.7	18.51
South Korea	53.9	18.8	33.3
Singapore	65.8	22.4	40.1
Malaysia	34.2	12.5	21.6

Calculated by the author using equation 5.

We can infer from Table 4 that Nigeria is not catching up in income levels with any of the countries considered either developed or newly emerging market economies. This is simply because they differ in structural parameters – production technology, saving rate, and in the rate of technological progress. According to prediction of Solow-swan model convergence will occur across countries in both growth rates and income levels if all structural parameters (production technology and saving rate) and the rate of technological progress are the same. In this case, the poor countries will initially exhibit lower capital-labour ratio than richer ones. This implies a higher marginal product of capital. Thus, given the equal rates of technological progress, labour force growth and domestic saving rate, their capital stock growth will exceed that in richer countries during a transitional period, but they should converge to capital-labour and capital-output ratios. As it can be observed Nigeria is no way approaching the standard of production technology obtained in developed nations or the newly industrializing economies of Asia. For Nigeria to attain the level of per capita income of Malaysia in 2008 it needs to grow at the rate of 12.5% annually.

The different growth rates and number of years it will take Nigeria to reach the expected per capita income of \$4,000 in the year 2020 are shown in Table 5. If Nigeria should grow at the rate of 5% per annum it will take Nigeria about 43 years to reach \$4,000 per capita in 2020. Growing at the rate of 25% per annum will take Nigeria about 9.4 years to attain the expected per capita income.

¹Rule of 72 is a simplified way to determine how long will take an income to double given a fixed annual rate of growth. Given, 19.1% annual growth rate, \$ 4, 000 per capita income will double in 4 years.

Table 5. Number of years to reach \$4,000 per capita at different growth rates

Percentage	No. of years
5	43
6	36
7	31.0
8	27.3
9	24.4
10	22
12	18.5
15	15
19	12
20	11.5
25	9.4

Calculated by the author using equation 5.

It should be noted that Nigerian GDP per capita growth rate in 2009 and 2010 were 7.0% and 7.9% respectively (World Bank, 2010). If Nigeria should growth at these rates, it would take her about 31 years for growth rate of 7.0% and 27.3 years for growth rate of 7.9%. Nigeria is growing but the growth rate is not so impressive to attain the target per capita income in the year 2020.

The results are in line with previous empirical findings on economic convergence. For instance, the convergence per capita income in Southern Africa [34], Western-Africa [35] and Eastern and Southern Africa [36] is toward a regional average for deeper regional integration which Nigeria is not aspiring to but rather towards a development status. Although there are some evidences of convergence, and few for catch-up, the need for macroeconomic stability does not require an absolute stance on policy harmonisation (i.e. convergence of macroeconomic policy). To meet the Nigerian aspiration policies must be designed to address national development needs and since circumstances may differ, policies may at times have to diverge. Nigeria achieving a convergence in monetary policy or inflation rate may be possible but the catch-up seems impossible at the present circumstances of the economy. The current inflation rate was 11.3% in September, 2012 and there is tendency that it will rise more. The unemployment rate in 2011 was 21% and saving rate is quite low compared to the benchmark countries the aspiration is not something that can be achieved within a fixed time period of 2006 - 2020. It ought to be gradual process.

The macroeconomic policy divergence witnessed in some cases has been driven primarily by the global financial and economic crises which were preceded by sharp rises in commodity and food prices. However, lack of political commitment and weaknesses in economic structures such as heavy dependence on oil exports and high level of unemployment have contributed to slow macroeconomic policy alignment in Nigeria.

7. CONCLUSION AND POLICY IMPLICATIONS

The results do indicate that there is evidence that Nigeria will converge with two developed nations – (USA and UK). This is partly because Nigeria trades mostly with United States and United Kingdom. Among the newly emerging markets, Nigeria can only converge with three countries namely – South Korea, South Africa and Malaysia. Since the pattern of convergence is not consistent even when time trend is included, it means that Nigeria has not consistently achieved a path of economic growth or development. This may be due to

differences in production techniques and technology. It is interesting to note that Nigeria can catch-up with Japan, Germany, South Africa and Singapore in the long run but this is not strongly assured. It appears that the existence of convergence hypothesis does not provide unequivocal support for the Solow model since the observance of leap frogging behaviour is inconsistent with this framework. From the results of the analysis it is observed that Nigeria can possibly achieve a similar inflation rate with the developed nations and newly emerging markets. This is clear as most of the coefficients are significant. But however, the measures (like manufacturing for domestic consumption and exports) to narrow the inflation rate to one digit are not strong enough to expect such in the near future.

There are some policy implications that emerged from the results. As internal security is crucial for Nigeria convergence, continued insecurity like armed robbery, kidnapping and militancy (boko haram) is likely to derail Nigerian development path. There is a great need for strong measures that will ensure minimum security of properties and lives. Where properties and lives are lost due to crimes, the growth rate is affected directly or indirectly. With the current waves of insecurity in Nigeria, individuals are not free to expand their opportunities in life. The fear of being exposed to kidnappers hinders investments. The lost of skilled workers affect manufacturing firms' productivities on which the growth of an economy tends to depend most. Thus the non-oil exports will tend to decrease as the firms produce under capacities.

Secondly most Nigerian investors may prefer investing abroad to domestic economy. This makes the match to development status in 2020 more difficult, if not impossible. Too, unemployment will tend to increase as investments shrink.

Nigeria is growing but the rate of growth is lower than it is expected to attain a targeted per capita income in the year 2020. In this regard, more support ought to be given to the manufacturing sector where most growth is expected to come from. Policies like tax breaks to industries need to be put place to enable them expand production and exports. Infrastructures should be provided to reduce the production costs which will enable the industries to produce at competitive prices.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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